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DURHAM, N.H. -- Arthur Mathieson's science is wholly modern, but his methods evoke memories of another era. Mathieson is a marine phycologist, or seaweed specialist, with the University of New Hampshire's department of plant biology and Jackson Estuarine Laboratory. Just as Victorian naturalists once did, Mathieson collects seaweed samples, carefully dries his specimens, and adds them to an impressive collection of preserved samples (housed, in this case, in the Hodgdon Herbarium at UNH). It's fitting, then, that one of Mathieson's most important collaborators is Frank Shipley Collins – an amateur botanist who died before Mathieson was even born.

Collins collected seaweed from the Gulf of Maine during the late 19$^{th}$ and early 20$^{th}$ centuries. His preserved specimens survive to this day, housed in museums and universities across the country. Thanks to Collins and his detailed collections, Mathieson has been able to make direct comparisons between flora past and present, in order to assess what changes have occurred in Casco Bay over the last century.

With funding from NH Sea Grant, Mathieson and several colleagues have collected thousands of seaweed samples from 200 sites around Casco Bay. Comparing their findings to Collins's samples, they've discovered that the bay's seaweed community is quite similar to that of the late 1800s, overall. Mathieson found 79 percent of the species that existed in the bay a century ago. In some specific sites within the bay, however, the similarity between historical and modern seaweed flora was less than 50 percent.

Some organisms have disappeared from the bay, Mathieson said, possibly as a result of pollution. Casco Bay is a major oil port and has suffered contamination by trace metals and organic pollutants. Meanwhile, new species have been introduced into the bay. Some are relatively benign. Others, such as the introduced Asian species Codium fragile, are not. This spongy green seaweed was introduced into Long Island Sound in the 1950s and was probably carried to Maine along with transported oysters. A tenacious invader, it can drive out native seaweeds and smother shellfish beds.

Despite the introductions and localized changes in flora, Mathieson was encouraged that, overall, the seaweed community hadn't changed significantly in the last hundred years. "Man has impacted Casco Bay, especially near the [heavily polluted] Fore River," Mathieson says. "But overall the bay's flora is intact."